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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
BASI, NIRMAL SINGH

ART UNIT	PAPER NUMBER
1646	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.	Applicant(s)
09/640,582	Juelich et al
Examiner	**Art Unit**
Nirmal S. Basi	1646

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *Jun 10, 2002* .

2a) ☐ This action is **FINAL.** 2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-46* is/are pending in the application.

4a) Of the above, claim(s) *4-11 and 19-46* is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-3 and 12-18* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9) ☒ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *Aug 17, 2002* is/are a) ☐ accepted or b) ☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some* c) ☒ None of:

1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

a) ☐ The translation of the foreign language provisional application has been received.

15) ☒ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s). 4
4) ☐ Interview Summary (PTO-413) Paper No(s). _____
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

1. Response to Restriction requirement filed 2/13/02 (paper number 7) has been entered. Submission of Sequence Listing filed 6/10/02 has been entered.

Election/Restriction

2. Applicant's election with traverse of Group 7 (Claims 1, 2, 3, 12, 14 and 15-18), in Paper No. 7 (2/13/02), is acknowledged. Claim 13 will be rejoined with the elected invention because it further limits claim 12, on which it depends. The traversal is on the ground(s) that since SEQ ID NOS: 1, 10, 11 and 15 al relate to human nucleic acids it would not be a serious burden to examine the groups together. This is not found persuasive because a search of groups 1-21 would not be co-extensive particularly with regard to the literature search. All the claimed nucleic acids are structurally different. An examination of the materially different, patentably distinct inventions in a single application would constitute a serious undue burden on the examiner.

The requirement is still deemed proper and is therefore made FINAL.

3. Acknowledgment is made of applicant's claim for foreign priority based on an application number 198 06 581.7, filed in Germany on 2/17/1998. It is noted, however, that applicant has not filed a certified copy of the PCT application as required by 35 U.S.C. 119(b).

4. The drawings objected to because each Figure must described separately in the Brief Description of the Drawings. Application does not contain the heading the Brief Description of

the Drawings. Fig. 1A is contained on three pages, each page should be labeled as Fig. 1A, Fig. 1B and Fig. 1C, or the equivalent, as required by 37 C.F.R. § 1.84 (u)(1). Each Figure be must described separately in the Brief Description of the Drawings as Fig. 1A, Fig. 1B and Fig. 1C. The Figures that are currently labeled as Fig. 1B and 1C should be relabelled as Fig. 1D and Fig. 1F, and must described separately in the Brief Description of the Drawings as Fig. 1D and Fig. 1F. Similarly the Figures that is currently labeled as Fig. 1D should be relabelled described separately in the Brief Description of the Drawings

Appropriate correction is required.

5. ***Sequence Rules Compliance***

This application fails to comply with the sequence rules, 37 CFR 1.821-1.825. Nucleotide and polypeptide sequences must be identified with the corresponding SEQ ID NO. Title 37, Code of Federal Regulations, Section 1.821 states "reference must be made to the sequence by use of the assigned identifier", the identifier being SEQ ID NO. Sequences in Fig. 1 must be identified by their corresponding SEQ ID NO:. Sequences on page 7 fail to comply with the Sequence Rules, they refer to an amino acid sequence without reference to a SEQ ID NO: identifier. Compliance with sequence rules is required.

Specification

6. The additions made in the specification could lead to confusion and mistake during the issue and printing processes. Accordingly, the portion of the specification as identified below is required to be rewritten or deleted. The specification is objected to because of the following

informalities: pages 7 contains hand written Insert 1, pages 8 contains hand written Insert 2, pages 10 contains hand written Insert 3 and Insert 4. Said inserts must be removed. The numbering of the pages in the specification is improper. Application contains pages 7-1, 7-2, 8-1, 8-2, 10-1, 10-2, 10-3 and 10-4. Appropriate correction of the pages is required. It appears that Applicant intended to insert the material of pages 7-1, 7-2, 8-1, 8-2, 10-1, 10-2, 10-3 and 10-4 into the specification which are hand written as Inserts 1-4.

A substitute specification is required pursuant to 37 CFR 1.125(a) because of the Inserts 1-4, indicated above. A substitute specification filed under 37 CFR 1.125(a) must only contain subject matter from the original specification and any previously entered amendment under 37 CFR 1.121. If the substitute specification contains additional subject matter not of record, the substitute specification must be filed under 37 CFR 1.125(b) and must be accompanied by: 1) a statement that the substitute specification contains no new matter; and 2) a marked-up copy showing the amendments to be made via the substitute specification relative to the specification at the time the substitute specification is filed.

Claim Rejection, 35 U.S.C. 112

7. Claims 1-3, 12-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 is indefinite because it is not clear what is an I_h ion channel or part thereof, so as to allow the metes and bounds of the claims to be determined. The name I_h ion channel does not sufficiently serve to characterize the claimed isolated or purified nucleic acid. The name does not provide any structural limitations so as to allow the metes and bounds of the claim be determined.

Claims 14 and 15 are indefinite because "Low stringency" hybridization condition and "high stringency" hybridization are not disclosed. The metes and bounds of the group of sequences that would meet the limitations of the claim depend upon the precise conditions under which hybridizations were performed including wash conditions.

Claims 1 and 3 are indefinite because it is not clear what is a part thereof. The specification, page 6, states that the term part encompasses deletions and additions of SEQ ID NO:1 while maintaining biological function. The biological function is not disclosed nor are the additions and deletions. It therefore follows that the phrase "part thereof" does not provide a meaningful structural limitation and encompasses an millions of variations

Claims 2, 12-13 and 16-18 are rejected for depending on an indefinite base claim and fail to resolve the issues raised above.

Claim Rejections - 35 USC § 101 and 35 USC § 112, 1st paragraph

The following is a quotation of 35 U.S.C. 101:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. Claims 1-3, 12-18 are rejected under 35 U.S.C. 101 because the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility.

A "specific utility" is a utility that is specific to the subject matter claimed, as opposed to a "general utility" that would be applicable to the broad class of the invention. A "substantial utility" is a utility that defines a "real world" use. Utilities that require or constitute carrying out further research to identify or reasonably confirm a "real world" context of use are not substantial utilities. A "well established utility" is a utility that is well known, immediately apparent, or implied by the specification's disclosure of the properties of a material, alone or taken with the knowledge of one skilled in the art. A "well established utility" must also be specific and substantial as well as credible.

Based on the record, there is not a "well established utility" for the claimed invention.

Applicant has asserted utilities for the specifically claimed invention of claims 1-3, 12-18. The specification diploses SEQ ID NO:1 is a partial sequence of the I_h channel from human

thalamus tissue (page 29) and the invention relates to the use of the sequence in a screening and/or diagnosing method and of treatment and/or prophylaxis or cardiovascular disorders and sleep disturbances (page 1). The specification also discloses I_h channels are important targets for neurotransmittres and messenger systems and play an important role in the control of cellular electrical activities (page 3).

The utilities asserted by Applicant are not specific or substantial. Neither the specification nor the art of record disclose any disease states treatable by the claimed polynucleotides or polypeptides encoded by them. Similarly, neither the specification nor the art of record disclose any instances where blocking any effects of the claimed polynucleotides or polypeptides encoded by them reduces the effect of a disease state. Thus the corresponding asserted utilities are essentially methods of treating unspecified, undisclosed diseases or conditions, which does not define a "real world" context of use. Treating an unspecified, undisclosed disease or condition would require or constitute carrying out further research to identify or reasonably confirm a "real world" context of use especially when the complete sequence of the claimed invention is not known. Since neither the specification nor the art of record disclose any activities or properties that would constitute a "real world" context of use for the claimed polynucleotides or the polypeptides encoded by them, further experimentation is necessary to attribute a utility to the claimed polynucleotides and encoded polypeptides. See Brenner v. Manson, 383 U.S. 519, 535–36, 148 USPQ 689, 696 (1966) (noting that "Congress intended that no patent be granted on a chemical compound whose sole 'utility' consists of its

potential role as an object of use-testing", and stated, in context of the utility requirement, that "a patent is not a hunting license. It is not a reward for the search, but compensation for its successful conclusion.").

The instant application does not disclose the biological role of the polynucleotide of SEQ ID NO:1 or its significance. Applicant asserts that the invention has uses in screening and/or diagnosing method and of treatment and/or prophylaxis or cardiovascular disorders and sleep disturbances.

These utilities are not considered to be specific and substantial because the specification fails to disclose any particular function or biological significance for the claimed polynucleotide. The disclosed protein, whose cDNA has been isolated, is said to have a potential function based upon its amino acid sequence similarity to other known proteins. After further research, a specific and substantial credible utility might be found for the claimed polynucleotide. This further characterization, however, is part of the act of invention and until it has been undertaken, Applicant's claimed invention is incomplete.

The instant situation is directly analogous to that which was addressed in *Brenner v. Manson*, 148 U.S.P.Q. 689 (1966), in which a novel compound which was structurally analogous to other compounds which were known to possess anti-tumor activity was alleged to be potentially useful as an anti-tumor agent in the absence of evidence supporting this utility. The court expressed the opinion that all chemical compounds are "useful" to the chemical arts when

this term is given its broadest interpretation. However, the court held that this broad interpretation was not the intended definition of "useful" as it appears in 35 U.S.C. §101, which requires that an invention must have either an immediately apparent or fully disclosed "real world" utility. The court held that:

> The basic quid pro quo contemplated by the Constitution and the Congress for granting a patent monopoly is the benefit derived by the public from an invention with substantial utility. . . . [u]nless and until a process is refined and developed to this point-where specific benefit exists in currently available form-there is insufficient justification for permitting an applicant to engross what may prove to be a broad field. . . . a patent is not a hunting license. . . .[i]t is not a reward for the search, but compensation for its successful conclusion.

The instant claims are drawn to a nucleic acid of as yet undetermined function or biological significance. There is no evidence of record or any line of reasoning that would support a conclusion that the claimed polynucleotide was, as of the filing date, useful for diagnosis, prevention and treatment of an disease, or for screening compounds. Until some actual and specific significance can be attributed to the nucleic acid identified in the specification as SEQ ID NO:1, or the gene encoding it, one of ordinary skill in the art would be required to perform additional experimentation in order to determine how to use the claimed invention. Thus, there was no immediately apparent or "real world" utility as of the filing date.

The nucleic acid of the instant invention and the protein encoded thereby are compounds which may share some structural similarity to channel proteins based on sequence similarity. As disclosed by the specification family of ion channels may have diverse effects, and play roles in the pathogenesis of various diseases, and bind different ligands Although the family ion

channels may share some common structural motifs, various members of the family may have different sites of action and different biological effects. In the absence of knowledge of the ligand for claimed invention, or the biological significance of this protein, there is no immediately evident patentable use. To employ a protein of the instant invention in any of the disclosed methods would clearly be using it as the object of further research. Such a use has been determined by the courts to be a utility which, alone, does not support patentability. Since the instant specification does not disclose a credible "real world" use for claimed polynucleotide, then the claimed invention as disclosed does not meet the requirements of 35 U.S.C. §101 as being useful.

Further, the specification not claims disclose what is the critical structure of the invention that is required for functionality. The claimed polynucleotide is incomplete and does not encode a complete polypeptide, and functionality is not disclosed. As regards the structural limitation, the hybridization conditions specified do not provide a meaningful structural limitation, see rejection under 35 USC 112, second paragraph, above.

For a utility to be "well-established" it must be specific, substantial and credible. All nucleic acids and genes are in some combination useful in screening assays. However, the particulars of screening with SEQ ID NO:1 are not disclosed in the instant specification. Neither the substances that act on the claimed compound nor the susceptible organ systems are identified. Therefore, this is a utility which would apply to virtually every member of a general class of materials, such as any collection of proteins or DNA, but is only potential with respect to SEQ ID

NO:1. Because of this, such a utility is not specific and does not constitute a "well-established" utility. Further, because any potential diagnostic utility is not yet known and has not yet been disclosed, the utility is not substantial because it is not currently available in practical form. Further, use of the claimed polynucleotide in an array for toxicology screening is only useful in the sense that the information that is gained from the array is dependent on the pattern derived from the array, and says nothing with regard to each individual member of the array. Again, this is a utility which would apply to virtually ever member of a general class of materials, such as any collection of proteins or DNA. Even if the expression of Applicants' individual polynucleotide is affected by a test compound in an array for drug screening, the specification does not disclose any specific and substantial interpretation for the result, and none is known in the art. Given this consideration, the individually claimed polynucleotide has no "well-established" use. The artisan is required to perform further experimentation on the claimed material itself in order to determine to what "use" any expression information regarding this nucleic acid could be put.

With regard to diagnosis of disease, there is no requirement that each and every class of nucleic acids sequences or the proteins they encode have an established correlation with a particular disease. However, in order for a polynucleotide or protein to be useful, as asserted, for diagnosis of a disease, there must be a well-established or disclosed correlation or relationship between the claimed polynucleotide and a disease or disorder. The presence of a polynucleotide in a tissue is not sufficient for establishing a utility in diagnosis of disease in the absence of some

information regarding a correlative or causal relationship between the expression of the claimed cDNA or protein and the disease. If a molecule is to be used as a surrogate for a disease state, some disease state must be identified in some way with the molecule. There must be some expression pattern that would allow the claimed polynucleotide to be used in a diagnostic manner. Many proteins are expressed in normal tissues and diseased tissues. Therefore, one needs to know, e.g., that the claimed polynucleotide is either present only in cancer tissue to the exclusion of normal tissue or is expressed in higher levels in diseased tissue compared to normal tissue (i.e. over expression). Evidence of a differential expression might serve as a basis for use of the claimed polynucleotide as a diagnostic for a disease. However, in the absence of any disclosed relationship between the claimed polynucleotide or the protein that is encoded thereby and any disease or disorder and the lack of any correlation between the claimed polynucleotide or the encoded protein with any known disease or disorder, any information obtained from an expression profile would only serve as the basis for further research on the observation itself. "Congress intended that no patent be granted on a chemical compound whose sole 'utility' consists of its potential role as an object of use-testing." *Brenner*, 148 USPQ at 696. The disclosure does not present a substantial utility that would support the requirement of 35 U.S.C. §101.

The polypeptide encoded by the polynucleotide of SEQ ID NO:1 belongs is a family in which the members have divergent functions based on which tissues the protein is expressed or administered to. Assignment to this family does not support an inference of utility because the

members are not known to share a common utility. There are some protein families for which assignment of a new protein in that family would convey a specific, substantial and credible utility to that protein. For example, some families of enzymes such as proteases, ligases, telomerases, etc. share activities due to the particular specific biochemical characteristics of the members of the protein family such as non-specific substrate requirements, that are reasonably imputed to isolated compositions of any member of the family.

The diversity of the ion channels has already been described. Without some common biological activity for the family members, a new member would not have a specific, substantial, or credible utility when relying only on the fact that it has structural similarity to the other family members. The members of the family have different biological activities which may be related to tissue distribution but there is no evidence that the claimed compounds share any one of diverse number of activities. That is, no activity is known to be common to all members. To argue that all the members can be used for screening and diagnosis, is to argue a general, nonspecific utility that would apply to virtually every member of the family, contrary to the evidence. Further, any compound could be considered as a regulator or modulator of tissue in that any compound, if administered in the proper amount, will stimulate or inhibit tissue. For example, salt, ethanol, and water are all compounds which will kill cells if administered in a great enough amount, and which would stimulate cells from which these compounds had been withheld, therefore, they could be considered regulators or modulators of tissue. However, use of these compounds for the modulation of tissue would not be considered a specific and substantial utility unless there was

some disclosure of, for example, a specific and particular combination of compound/composition and application of such in some particular environment of use.

Without knowing a biological significance of the claimed polypeptides or the polynucleotides or the polypeptide encoded thereby, one of ordinary skill in the art would not know how to use the claimed invention in its currently available form in a credible "real world" manner based on the diversity of biological activities possessed by the channel proteins. Contrast *Brenner*, 148 USPQ at 694 (despite similarity with adjacent homologue, there was insufficient likelihood that the steroid would have similar tumor-inhibiting characteristics), with *In re Folkers*, 145 USPQ 390, 393 (CCPA 1965) (some uses can be immediately inferred from a recital of certain properties) or *In re Brana*, 34 USPQ 1436, 1441 (Fed. Cir. 1995) (evidence of success in structurally similar compounds is relevant in determining whether one skilled in the art would believe an asserted utility; here, an implicit assertion of a tumor target was sufficiently specific to satisfy the threshold utility requirement).

The utility must be specific, substantial and credible. Applicants' assertion that the claimed invention has utility in drug screening, testing, drug development and disease diagnosis, do not meet the standards for a specific, substantial, and credible or well-established utility for reasons set forth above.

The specification does not disclose the significance of any test results, nor is there any evidence that the significance was known as of the filing date. If the expression of the claimed polynucleotide increases, is this a positive or negative outcome? Would this be a toxic response

or not? The disclosure is insufficient to evaluate the results of the test in any meaningful manner.

Specific utility must be shown or be evident for each member of the class. None of the utilities identified by Applicant, have been demonstrated to be specific to SEQ ID NO:1. One of ordinary skill in the art must understand how to achieve an immediate and practical benefit from the claimed species based on the knowledge of the class. However, no practical benefit has been shown for the use of SEQ ID NO:1.

The record shows that the ion channel protein family is diverse, and has such a broad definition, that a "common utility" cannot be defined. Moreover, the evidence of record is inadequate to determine the disease(s), drug(s) or toxicological screen(s) for which the compounds would be useful. In *Brenner,* the Court approved a rejection for failure to disclose any utility for a compound where the compound was undergoing screening for possible tumor-inhibiting effects and an adjacent homologue of the compound had proven effective. *Brenner*, 148 USPQ at 690. Here, there is no evidence that the claimed isolated compounds have any utility.

For all the above reasons, the disclosure is insufficient to teach one of skill in the art how to use the invention. A review of *In re Wands,* 8 USPQ2d 1400 (CAFC 1988) clearly points out the factors to be considered in determining whether a disclosure would require undue experimentation and include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature

of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art and, (8) the breadth of the claims. All of these factors are considerations when determining the whether undue experimentation would be required to use the claimed invention. As is evidence in the discussions *supra*, each of these factors has been carefully considered in the instant grounds of rejection, and it is concluded that undue experimentation would be required by the skilled artisan to use the instant invention.

The use of the claimed invention in drug discovery, and disease diagnosis are not substantial utilities. The question at issue is whether or not the broad general assertion that the claimed nucleic acids might be used for *some* diagnostic application in the absence of a disclosure of *which* diagnostic application would be considered to be an assertion of a specific, substantial, and credible utility. For reasons set forth above the disclosure satisfies none of the three criteria *See In re Kirk*, 153 USPQ 48, 53 (CCPA 1967) (quoting the Board of Patent Appeals, 'We do not believe that it was the intention of the statutes to require the Patent Office, the courts, or the public to play the sort of guessing game that might be involved if an applicant could satisfy the requirements of the statutes by indicating the usefulness of a claimed compound in terms of possible use so general as to be meaningless and then, after his research or that of his competitors has definitely ascertained an actual use for the compound, adducing evidence intended to show that a particular specific use would have been obvious to men skilled in the particular art to which this use relates.')

However, for reasons set forth above, the specification has not provided sufficient evidence to support specific utility for SEQ ID NO:1. The present rejection under § 101 follows *Brenner v. Manson*, as set forth above. In that case, the absence of a demonstrated specific utility for the claimed steroid compound was not ameliorated by the existence of a demonstrated general utility for the class. Unlike *Fujikawa v. Wattanasin*, where there were pharmaceutically acceptable in vitro results, here, there is nothing other than relatively low levels of sequence homology to a broad and diverse family of proteins having distinct modes of activity, and no disclosed common mode of action. As Applicant recognizes, a rejection under § 112, first paragraph, may be affirmed on the same basis as a lack of utility rejection under § 101. *See, e.g., In re Swartz*, 56 USPQ2d 1703 (Fed. Cir. 2000); *In re Kirk*, 153 USPQ 48 (CCPA 1967).

7. Claims 1-3, 12-18 are also rejected under 35 U.S.C. 112, first paragraph. Specifically, since the claimed invention is not supported by either a specific and substantial asserted utility or a well established utility for the reasons set forth above, one skilled in the art clearly would not know how to use the claimed invention.

Further hybridization conditions of claims 14 and 15 are indefinite, as stated in the claim rejection under 35 U.S.C. 112 , second paragraph. The hybridization conditions recited in the claims do not constitute a meaningful structural limitation and the claim recite no functional language. The instant fact pattern closely resembles that in Ex parte Maizel, 27 USPQ2d 1662 (BPAI 1992). In Ex parte Maizel, the claimed invention was directed to compounds which were

defined in terms of function rather than sequence (i.e., "biologically functional equivalents"). The only disclosed compound in both the instant case and in Ex parte Maizel is the, naturally occurring compound, polynucleotide represented by SEQ ID NOs: 1, in instant application. The Board found that there was no reasonable correlation between the scope of exclusive right desired by Appellant and the scope of enablement set forth in the patent application. Even though Appellant in Ex parte Maizel urged that the biologically functional equivalents consisted of proteins having amino acid substitutions wherein the substituted amino acids had similar hydrophobicity and charge characteristics such that the substitutions were "conservative" and did not modify the basic functional equivalents of the protein, the Board found that the specification did not support such a definition, and that the claims encompassed an unduly broad number of compounds. Such is the instant situation. Clearly, a disclosed partial polynucleotide sequence does not support claims to nucleic acid hybridizing to same, given the lack of guidance regarding what sequences would hybridize specifically to the polynucleotide of SEQ ID NO:1, and not other, related sequences. Further many of the nucleic acids isolated by hybridization to the nucleic acid of SEQ ID NO:1 would encode unrelated or non-functional protein. Applicant has not disclosed how to use the unrelated polynucleotides or those encoding non-functional polypeptide. Further the claims drawn to vector comprising claimed isolated nucleic acid, host cell containing said vector and composition comprising claimed nucleic acid are not enabled for these reasons given above. Further many of the nucleic acids that are at least 80% or 90% identical to SEQ ID NO:1 may encode non functional polypeptides or unrelated polypeptides, the

specification does not disclose how to use said nonfunctional or unrelated compounds. There is no disclosure of the critical feature of the invention required for function.

9 Claims 1-3, 12-18 rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The instant specification does not contain a written description of the invention in such full, clear, concise, and exact terms or in sufficient detail that one skilled in the art can reasonably conclude that applicant had possession of the claimed invention at the time of filing.

The claims are drawn to isolated or purified nucleic acid which codes of Ih ion channel or part thereof, said nucleic acid characterized in that:

a) is of human origin, comprising SEQ ID NOs: 1 or part thereof

b) hybridizes under low or high stringency to the nucleic acid of SEQ ID NOs: 1.

c) is at least 80% or 90% identical to the nucleic acid of SEQ ID NO:1

The claims are further drawn to vector containing said nucleic acid and cell containing said vector and compositions a-c.

The specification discloses the nucleic acid of SEQ ID NO:1 is a partial polynucleotide sequences of an ion channel protein. The functionality of claimed nucleic acid is not disclosed. The specification nor prior art discloses that the nucleic acid claimed encodes a functional protein, nor what that function is. The claims, as written, however, encompass polynucleotides

which vary substantially in length and also in nucleotide composition. The broadly claimed genus encompasses functional ion channel nucleic acids, genes, chimeric constructs, fusion constructs and variants thereof.

The instant disclosure of a single species of nucleic acid does not adequately describe the scope of the claimed genus, which encompasses a substantial variety of subgenera including full-length genes. A description of a genus of cDNAs may be achieved by means of a recitation of a representative number of cDNAs, defined by nucleotide sequence, falling within the scope of the genus or of a recitation of structural features common to members of the genus, which features constitute a substantial portion of the genus. *Regents of the University of California v. Eli Lilly & Co.*, 119 F3d 1559, 1569, 43 USPQ2d 1398, 1406 (Fed. Cir. 1997). The instant specification fails to provide sufficient descriptive information, such as definitive structural or functional features of the claimed genus of polynucleotides. There is no description of the conserved regions which are critical to the structure and function of the genus claimed. The specification proposes to discover other members of the genus by using hybridization techniques. There is no description, however, of the sites at which variability may be tolerated and there is no information regarding the relation of structure to function. Structural features that could distinguish the compounds in the genus from others excluded are missing from the disclosure. Furthermore, the prior art does not provide compensatory structural or correlative teachings sufficient to enable one of skill to isolate and identify the polynucleotides encompassed and no identifying characteristic or property

of the instant polynucleotides is provided such that one of skill would be able to predictably identify the encompassed molecules as being identical to those instantly claimed.

Since the disclosure fails to describe the common attributes or characteristics that identify members of the genus, and because the genus is highly variant, the disclosure of specific nucleotide sequences and the ability to screen, is insufficient to describe the genus. The critical feature of the invention required for function is not disclosed. One of skill in the art would reasonably conclude that the disclosure fails to provide a representative number of species to describe and enable the genus as broadly claimed. An adequate written description of a DNA, such as the cDNA of instant application, "requires a precise definition, such as by structure, formula, chemical name, or physical properties," not a mere wish or plan for obtaining the claimed chemical invention. *Fiers v. Revel* , 984 F.2d 1164, 1171, 25 USPQ2d 1601, 1606 (Fed. Cir. 1993). Accordingly, "an adequate written description of a DNA requires more than a mere statement that it is part of the invention and reference to a potential method for isolating it; what is required is a description of the DNA itself." Id. at 1170, 25 USPQ2d at 1606. (page 1404)

No claim is allowed.

Advisory Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nirmal Basi whose telephone number is (703) 308-9435. The examiner can normally be reached on Monday-Friday from 9:00 to 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Yvonne Eyler, can be reached on (703) 308-6564. The fax phone number for this Group is (703) 308-0294.

Official papers filed by fax should be directed to (703) 308-4242. Faxed draft or informal communications with the examiner should be directed to (703) 308-0294.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0196.

Nirmal S. Basi
Art Unit 1646
August 25, 2002

MICHAEL PAK
PRIMARY EXAMINER